

the inhabitants of England and of Scotland, mainly of Anglo-Saxon origin, voted together on this subject; whereas a contrary opinion regarding this same question was held by the greater proportion of the people of Ireland, and to a large extent by the Welsh, most of whom are derived from Ibero-Mongolian ancestors. It is difficult to account for the diversity in the sentiments of the people above referred to unless we consider it due to their racial mental qualities. Environment has doubtless played an important part in the evolution of these people, but their inherited racial character has had more to do with the position which the Anglo-Saxon race has gained in the world than the mineral wealth, climate, or protection afforded us by our seagirt coast.

The environment under which even a few generations of men exist would seem capable of influencing the structure of their central nervous system, as illustrated by comparing the mental qualities of our rural and urban population. The conditions under which the city-bred person, child and man, lives engender in the course of a few generations an unstable state of nerve structure, resulting in an excitable character which, if carried beyond a certain point, leads to unsoundness of mind, and may account for the increasing number of lunatics in this and the other large cities of Europe. General Sir Redvers Buller, again, in speaking of the soldiers under his command in South Africa, refers to the fact that our city-born men have imperfect sight compared with men reared in the open plains of the Transvaal, thus affording us another example of the effects of environment on the race. These are a few of the many interesting and important subjects which arise in connection with the study of anthropology, including craniology; and the contents of our museum and library offer unrivalled opportunities to the student seeking for knowledge in those branches of science.

In conclusion, as already stated, much of Hunter's reputation was founded on the result of his labours in those branches of science which tend to elucidate man's nature; and during the past century a succession of English surgeons has carried on the work commenced by our great master, enriching our museum and endeavouring to make this college, not only an examining and licensing body, but, what it certainly should be, an imperial institution for the cultivation and diffusion of those departments of knowledge which bear on the art and science of surgery. The ideas entertained by John Hunter's immediate successors on this subject were ably stated by Sir William Lawrence in his lectures already referred to. He observes that "our own individual credit, and the dignity, honour and reputation of our body, which we are bound to maintain, demand that surgeons should not be behind any other class in the possession either of the cultivation of branches of knowledge directly connected with surgery or in any of the collateral pursuits less immediately attached to it. It is only in reference to such views and objects that the Hunterian collection could have been accepted or can be of any use to this college." Hunter would, if he had still been with us, have thrown all his indomitable energies into the successful working of such an institution, and amidst the turmoil, strife and competition going on around him would, as we see him in this picture, have been engaged in the earnest, accurate, patient study of nature. It remains for our younger members to emulate the example set them by John Hunter, and by such service to secure for themselves lasting satisfaction, and beyond that add to the real dignity and utility of their college and their profession.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—The 22nd meeting of the Junior Scientific Club was held on Friday, February 22. Mr. H. B. Hartley (Balliol) read a paper entitled, "Polymorphism; an Historical and Experimental Account," which was followed by a paper by Prof. Townsend entitled, "The Conductivity of Gases."

CAMBRIDGE.—The subject for the Adams prize in 1903 is, "The bearing on mathematical physics of recent progress in the theory of the representation of discontinuous quantity by series, with special consideration of the logical limitations of the processes involved." The prize is open to all graduates of the University, and is of the value of 25*l*. Essays are to be sent privately to the Vice-Chancellor by December 16, 1902.

The tender for the new School of Botany, to be erected behind

NO. 1636, VOL. 63]

the Sedgwick Museum, amounts to some 23,000*l*. It is recommended for acceptance by the syndicate.

AN animated debate occurred in the House of Commons on Tuesday on the attitude taken up by the Board of Education towards higher-grade elementary schools in which science is taught, leading to the judgment in the case of "Regina v. Cockerton," that grants made by School Boards for scientific instruction are illegal. In the course of his reply to various criticisms, Sir John Gorst said that the Government proposed to introduce a Bill for the creation of secondary education authorities having power to provide instruction in subjects that were not contained in the Elementary Day School and Evening Continuation School Code. He agreed that we should not have a proper system of education until one authority was established in a district, having control over schools of every kind and every grade. If a change of that kind were made, overlapping would cease and the existing chaos would disappear.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, February 7.—"The Boiling Point of Liquid Hydrogen, determined by Hydrogen and Helium Gas Thermometers." By James Dewar, M.A., I.L.D., F.R.S., Professor of Chemistry at the Royal Institution, and Jacksonian Professor, University of Cambridge.

In a former paper it was shown that a platinum-resistance thermometer gave for the boiling point of hydrogen $-238^{\circ}\cdot4$ C., or $34^{\circ}\cdot6$ absolute. As this value depended on an empirical law correlating temperature and resistance which might break down at such an exceptional temperature, and was in any case deduced by a large extrapolation, it became necessary to have recourse to the gas thermometer. The gases used as thermometric substances were hydrogen, oxygen, helium and carbonic acid.

Taking the average values given by the experiments as being the most probable, then the boiling point of oxygen is $-182^{\circ}\cdot5$ and that of hydrogen is $252^{\circ}\cdot5$, or $20^{\circ}\cdot5$ absolute. The temperature found for the boiling point of oxygen agrees with the mean results of Wróblewski, Olszewski and others. If the boiling point of oxygen is raised to -182° , which is the highest value it can have; then an equal addition to the hydrogen value must follow, making it then -252° or 21° absolute. In a future communication the temperature of solid hydrogen will be discussed.

February 14.—"On the influence of Ozone on the Vitality of some Pathogenic and other Bacteria." By Dr. Arthur Ransome, F.R.S., and Alexander G. R. Foulerton.

The experiments have shown that ozone in the dry state, and in such strength as the authors used it, has no appreciable action on the vitality of the various bacteria experimented with, and, so far, the results are in accordance with those of Sonntag and Ohlmüller. Nor did a prolonged exposure to the action of ozone diminish in any way the pathogenic virulence of *B. tuberculosis* in sputum. Single experiments would also tend to show that ozone can have little, if any, effect on the pathogenic virulence of *B. mallei* and *B. anthracis*.

On the other hand, the experiments would appear to confirm the conclusion arrived at by Ohlmüller as to the bactericidal property of ozone when passed through a fluid medium containing bacteria in suspension.

A comparison of the inactivity of ozone as a disinfectant in the dry state with its action in the presence of water suggests a superficial resemblance with other gases, such as chlorine and sulphur dioxide. In the absence of further experiment, however, it would not be possible to press the analogy too closely.

In the dry state, and under the conditions in which it occurs in nature, ozone, then, is not capable of any injurious action on bacteria so far as can be judged from the experiments; and it is concluded that any purifying action which ozone may have in the economy of nature is due to the direct chemical oxidation of putrescible organic matter, and that it does not in any way hinder the action of bacteria, which latter are, indeed, in their own way, working towards the same end as the ozone itself in resolving dead organic matter to simpler non-putrescible substances.

"On the Functions of the Bile as a Solvent." By Benjamin Moore and William H. Parker. Communicated by Prof. E. A. Schäfer, F.R.S.

In this paper evidence is brought forward that the bile exercise

an important action as a solvent, and the authors claim that this is the chief, if not the only function of that secretion. It is pointed out that the bile in this respect has a twofold action: first, in aiding in the excretion of cholestearin and lecithin; and, secondly, in aiding in the absorption of fatty acids and sodium soaps from the intestine. All these substances possess a low solubility in water, and have their solubility increased in bile chiefly by virtue of the properties of the bile salts. The fact that cholestearin is still but slightly soluble in bile explains the well-known fact that gallstones are composed almost exclusively of that substance, while lecithin is very soluble in bile and hence is never deposited. This view as to the action of the bile also furnishes an easy explanation for the so-called "circulation of the bile." It further explains the faulty absorption of fat in the absence of either bile or pancreatic juice, and the almost complete failure of fat absorption when both these secretions are excluded from the alimentary canal.

"On the Application of the Kinetic Theory of Gases to the Electric, Magnetic, and Optical Properties of Diatomic Gases." By George W. Walker, B.A., A.R.C.Sc., Fellow of Trinity College, Cambridge, Sir Isaac Newton Research Student. Communicated by Prof. Rücker, Sec. R.S.

Zoological Society, February 19.—Dr. Henry Woodward, F.R.S., vice-president, in the chair.—Dr. W. G. Ridewood exhibited some microscopic preparations of the hairs of three species of zebra, viz. *Equus burchelli*, *E. zebra* and the newly described *E. johnstoni*, in order to show that the hairs of the last-named animal agreed in structure with those of the other two zebras. A letter received from Prof. Ewart on the same subject stated that he was quite of the same opinion.—Mr. F. E. Beddard, F.R.S., exhibited and made remarks upon a specimen of a female Schmidt's monkey (*Cercopithecus schmidti*) with four mammae.—Mr. R. Lydekker, F.R.S., described, under the provisional name *Sotalia borneensis*, an apparently new species of estuarine dolphin from Borneo, a specimen of which had recently been received at the British Museum.—Mr. Lydekker also gave a description of the Kashmir ibex (*Capra sibirica sasin*), and pointed out the differences between this and the three other races of *Capra sibirica*.—Mr. F. E. Beddard, F.R.S., read a paper on the broad-nosed lemur (*Haplorhina simus*), which dealt with the points of difference in structure between this species and *H. griseus*.—A communication from Dr. J. G. de Man contained a description of *Potamon (Potamonautes) floweri*, a new species of crab obtained by Captain S. S. Flower on the Bahr-el-Gebel, during his expedition up the White Nile in 1900, and remarks on other species of *Potamon*.—Mr. R. H. Burne read a paper entitled "A Contribution to the Myology and Visceral Anatomy of the Fairy Armadillo (*Chlamyphorus truncatus*)," in which the myology of this rare Edentate was reviewed, with special reference to the two previous descriptions by Hyrtl and Macalister, and features were pointed out in which this individual showed a greater similarity to *Dasybus* than those hitherto examined.—Dr. C. I. Forsyth Major read a paper on some characters of the skull in lemurs and monkeys, in which he pointed out, amongst other results, that the *os planum* of the ethmoid, about which some doubts had existed as to its presence in lemurs, was found to occur in the young stages of many of these animals, and that the facial expansion of the lacrymal bone in the lemurs as well as in the monkeys was not a primitive condition but an extreme specialisation.—Mr. Martin Jacoby read a paper containing descriptions of fourteen new species of phytophagous coleoptera of the family Chlamyidae.

Royal Meteorological Society, February 20.—Mr. W. H. Dines, president, in the chair.—Mr. E. Mawley presented his report on the phenological observations for 1900. During the greater part of the winter and spring the weather proved cold and sunless, but in the summer and autumn the temperature was, as a rule, high and there was an unusually good record of bright sunshine. As affecting vegetation the two most noteworthy features of the phenological year ending November, 1900, were the cold, dry and gloomy character of the spring months and the great heat and drought in July. Throughout the whole of the flowering season wild plants came into blossom much behind their average dates, indeed later than in any year since 1891. Such spring emigrants as the swallow, cuckoo and nightingale were also later than usual in visiting these shores. Taking the British Isles as a whole, the crops of wheat, barley

and oats were all more or less under average. The yield of hay was poor in the southern half of England, but elsewhere varied from a fair to an abundant crop. Turnips and swedes were almost everywhere deficient, but there was a heavy crop of mangolds. Potatoes were under average. This was a bountiful year as regards fruit, the yield of apples, plums and all the small fruits being in excess of the average.—Mr. A. E. Watson read a paper entitled "A review of past severe winters in England with deductions therefrom." From an examination of the records of the severe winters of the last 300 years, he has come to the conclusion that they are most frequent in the years with the numbers 0-1 and 4-5. He is also of opinion that the severe winter in the middle of each decade is generally a late one (January to March) while that at the beginning or end of each decade is generally an early one (November to January).

MANCHESTER.

Literary and Philosophical Society, February 19.—Prof. Horace Lamb, F.R.S., president, in the chair.—Mr. Charles Bailey made a communication entitled "On *Ranunculus Bachii*, Wirtgen, as a form of *Ranunculus fluitans*, Lamarck." This aquatic plant is very polymorphic, as seen in the series of British examples exhibited. In the south of England, the stout stems are several feet in length, the leaves and peduncles are from six inches to a foot long, and the flowers are as large as a shilling or a florin. It is a frequent plant in the Herefordshire Wye and in the Severn, but in the immediate neighbourhood of Manchester it has been gathered in but one station, viz., the Derbyshire Derwent, at Whatstandwell. The plant occurs in canals and swift-running brooks, but its most congenial station is a well-filled river. It becomes less frequent in Great Britain as one ascends northwards, and just manages to occupy a few of the southern counties of Scotland. The range of examples exhibited showed that there exist all intermediates between the diminutive form collected at Ayton in the north, and the nine or ten feet plant of the New Forest in the south. Mr. Bailey's conclusions regarding this plant accord with Wirtgen's later view of it, namely, that the differences between it and the type are merely comparative.—Mr. R. S. Hutton exhibited an almost exact reproduction of Moissan's electric furnace, which has been set up at the Owens College. There it is possible, with a 50 horse-power engine, to produce a current of 700 amperes at 50 volts, and by that means it is anticipated that researches at the high temperatures thus available—viz., 3500° C., or higher—will shortly be able to be carried out. Graphite prepared in electric furnaces was also shown, as well as specimens of various carbides, carborundum, &c., from the Niagara works. The specimens exhibited illustrated the facility with which some of the rarer metals now become available, those shown being chromium and manganese. A modern form of the Lippmann electrometer was also exhibited by Mr. Hutton.

PARIS.

Academy of Sciences, February 25.—M. Fouqué in the chair.—The appearance of a new star in the constellation of Perseus, by M. Loewy. This star, when discovered by Dr. Anderson, at Edinburgh, on February 21, was of the magnitude of 2.7. Two nights later it was estimated by M. Robert, at Saint-Jean-d'Angély, as being of the first magnitude.—Studies on the agricultural value of land in Madagascar, by MM. A. Müntz and E. Rousseaux. The soil of the belt on the coast line from its composition would probably prove fertile, but the ferruginous earths of the central *massif* are poor and unfit for culture, except at the bottoms of the valleys. The island, taken as a whole, is poorly provided with the materials necessary for plant growth, and it does not appear likely that it could ever support a dense population.—On the appearance of a new star in the constellation of Perseus, by M. Flammarion. A letter to the Permanent Secretary containing the results of observations on the new star, by MM. Lucien Bosc, A. Robert, Lotte, and Bruguère.—On the variations in magnitude and position of the satellites of Jupiter, revealing the existence of a cosmic atmosphere, by Dom Lamey. The observations recorded by the author can only be satisfactorily explained by the assumption of the existence of an atmosphere in the form of a ring, composed of a material too subtle to condense, but sufficiently dense to modify by refraction the images of stars traversing it in the equatorial plane.—On a certain category of transcendental functions, by M. Edmund Maillet.—The superficial traces left by the tools in the operation

of sawing metals, by M. Vasseur. From the analysis given, it would appear that the lines discovered by M. Fremont have no relation with the curves of distribution of deformations in vmetals, but depend upon the nature and condition of the saw employed.—On the insulating properties of snow, by M. Bernard Brunhes.—On certain conditions of reversibility, by M. Albert Colson. The reversibility of the reaction between carbon dioxide and silver oxide is dependent upon the presence of water vapour.—The compressibility of solutions, by M. Guinchant. Up to a pressure of four atmospheres the volume of the dissolved body is independent of the pressure.—Contribution to the study of indium, by MM. C. Chabrie and E. Rengade. On prolonged boiling, caesium indium alum deposits pure indium oxide. Determinations of the molecular weight of indium acetylacetonate in boiling ethylene bromide are consistent with the trivalency of this element.—On a new crystallised sulphate of molybdenum, by M. Bailhache.—Some new reactions of organo-metallic derivatives, by M. E. E. Blaise. A mode of synthesis of alkyl-ketonic esters.—Action of the organo-metallic derivatives upon alkyl esters, by M. A. Behal. The final product of the action of an excess of magnesium isoethyle upon an ester, R.CO.OEt, is an ethylenic hydrocarbon, R.C(CH₃)₂:CH₂.—Synthesis of tertiary alcohols in the fatty series, by M. Henri Masson.—On the absorption spectra of the indophenols and the colouring matters derived from triphenylmethane, by MM. C. Camichel and P. Bayrac.—On the constitution of glucose, by M. L. J. Simon.—The diastatic actions of colloidal platinum and other metals, by M. G. Bredig. A solution of colloidal platinum shows a remarkable analogy with the enzymes in its catalytic action towards hydrogen peroxide. Both the colloidal metal and the enzyme increase in activity with increasing temperature up to a certain point, and then fall off, and both are similarly influenced by the addition of minute quantities of hydrocyanic acid or sulphuretted hydrogen.—The function of the peritoneal canals, by M. S. Jourdain.—The action of chloroform upon the reducing action of the blood, by MM. M. Lambert and L. Garnier.—On the identity of the modifications of structure produced in vegetable cells by cold, plasmolysis, and by drying, by MM. L. Matruchot and M. Mollard.—Food value and culture of the furze, by M. A. Ch. Girard.—The examination of a meteorite which fell in the island of Ceylon on April 13, 1795, by M. Stanislas Meunier.

DIARY OF SOCIETIES.

THURSDAY, MARCH 7.

- ROYAL SOCIETY, at 4.30.—Further Observations of Nova Persei: Sir Norman Lockyer, F.R.S.—Some Physical Properties of Nitric Acid Solutions: V. H. Veley, F.R.S., and J. J. Manley.—The Anatomy of Symmetrical Double Monstrosities in the Trout: Dr. J. F. Gemmill.—Preliminary Communication on the Oestrous Cycle and the Formation of the Corpus luteum in the Sheep: F. H. A. Marshall.—To be read *in title only*: On the Composition and Variations of the Pelvic Plexus in *Acanthias vulgaris*: R. C. Punnett.—On the Heat dissipated by a Platinum Surface at High Temperatures. IV. High Pressure Gases: J. E. Petavel.
- LINNEAN SOCIETY, at 8.—A Contribution to the Fresh-water Algae of Ceylon: Messrs. W. West and G. S. West.—On Mediterranean Malacostraca: A. A. Walker.
- INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Insulation on Cables: M. O'Gorman.
- CHEMICAL SOCIETY, at 8.—(1) Nomenclature of the Acid Esters of Unsymmetrical Dibasic Acids; (2) Additive Compounds of α - and β -Naphthylamine with Trinitrobenzene Derivatives; (3) Acetylation of Arylanines: J. J. Sudborough.—Formation of Amides from Aldehydes: R. H. Pickard and W. Carter.
- RÖNTGEN SOCIETY, at 8.—Exhibition of Skiagrams and Apparatus.

FRIDAY, MARCH 8.

- ROYAL INSTITUTION, at 9.—Vitrified Quartz: W. A. Shenstone, F.R.S.
- ROYAL ASTRONOMICAL SOCIETY, at 5.—Partial Solar Eclipse, 1900 November 22, observed in Western Australia: W. E. Cooke.—On the Observation of Position Angles of Polar Double Stars: R. T. A. Innes.—On the Oxford Photographic Determinations of Stellar Parallax: Reply to the Criticisms of Sir D. Gill: H. H. Turner.—Occultation of Jupiter and his Satellites, 1900, September 29: John Tebbutt.—Cape Double Star Results, 1900: Royal Observatory, Cape of Good Hope.—The Nearest Approach of Two Planets: C. F. Whitmill.—Observations of Leonids, 1900 November 15, 16: Royal Alfred Observatory, Mauritius.—Description of a Floating Photographic Zenith Telescope, and some Results obtained with it: Bryan Cookson.—Note on Mr. Cookson's Paper on the Accuracy of Eye Observations of Meteors: H. C. Plummer.—The Variable Star R Centauri: A. W. Roberts.—On the New Star in Perseus: A. Stanley Williams.—*Probable papers*: Photographic Positions of Nova Persei and Neighbouring Stars: University Observatory, Oxford.—Spectrum of Nova Persei: H. F. Newall.
- INSTITUTION OF CIVIL ENGINEERS, at 8.—Sewage Treatment: C. Johnston.

PHYSICAL SOCIETY, at 5.—A Theory of Colloidal Solutions: Dr. F. G. Donnan.—Exhibition of Apparatus: R. Appl-yard.—On the Production of a Bright Line Spectrum by Anomalous Dispersion and its Application the "Flash Spectrum": Prof. R. W. Wood.

MALACOLOGICAL SOCIETY, at 8.—Note on the Anatomy of *Thersites (Udrva) bipartita*, Fer.: S. Pace.—New Marine Shells from "the Kowie" of South Africa: G. B. Sowerby.—New Marine Shells from the Philippines, &c.: G. B. Sowerby.

SATURDAY, MARCH 9.

ROYAL INSTITUTION, at 3.—Sound and Vibrations: Lord Rayleigh, F.R.S.

MONDAY, MARCH 11.

SOCIETY OF ARTS, at 8.—Electric Railways: Major Philip Cardew.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—The Geography of the North-West Frontier of India: Col. Sir Thomas H. Holdich, K.C.I.E., C.B.

TUESDAY, MARCH 12.

ROYAL INSTITUTION, at 3.—The Cell as the Unit of Life: Dr. A. Macfadyen.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Aesthetic Treatment of Bridge Structures: J. Husband.

ROYAL PHOTOGRAPHIC SOCIETY, at 8.—The Apochromatic Collinear Lens: Dr. Harting.

WEDNESDAY, MARCH 13.

SOCIETY OF ARTS, at 8.—The Proposed High-Speed "Monorail" between Liverpool and Manchester: F. B. Behr.

THURSDAY, MARCH 14.

ROYAL SOCIETY, at 4.30.

ROYAL INSTITUTION, at 3.—Greek and Roman Portrait Sculpture: Prof. Percy Gardner.

MATHEMATICAL SOCIETY, at 5.30.

SOCIETY OF ARTS (Indian Section), at 4.30.—The Growth and Trend of Indian Trade—a Forty Years' Survey: H. J. Tozer.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Some Notes on Poly-phase Substation Machinery: A. C. Eborall.

FRIDAY, MARCH 15.

ROYAL INSTITUTION, at 9.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.—Combined Trolley and Conduit Tramway Systems: A. N. Connett.

EPIDEMIOLOGICAL SOCIETY, at 8.30.—The Enteric Fever Mortality in Copenhagen from 1828-1898: Dr. N. P. Schierbeck.—The Effect of Sewerage and Water Supply upon the Behaviour of Enteric Fever in Buenos Ayres: Dr. J. T. R. Davison.

SATURDAY, MARCH 16.

ROYAL INSTITUTION, at 3.—Sound and Vibrations: Lord Rayleigh, F.R.S.

CONTENTS.

	PAGE
The Present Aspect of some Cytological Problems.	
By Prof. J. B. Farmer, F.R.S.	437
Method in Philosophy. By H. W. B.	438
Our Book Shelf:—	
Ewart: "First Stage Botany, as Illustrated by Flowering Plants"	439
Gray: "The Principles of Magnetism and Electricity. An Elementary Text-book."—A. H.	439
Frenkel: "Die Lehre vom Skelet des Menschen unter besonderer Berücksichtigung entwicklungsgeschichtlicher und vergleichend-anatomischer Gesichtspunkte und der Erfordernisse des anthropologischen Unterrichtes an höheren Lehranstalten"	440
Chemin: "De Paris aux Mines d'Or de l'Australie occidentale"	440
Letters to the Editor.—	
Malaria and Mosquitoes.—Major R. Ross	440
Abundance of Peripatus in Jamaica.—Dr. J. E. Duerden	440
Audibility of the Sound of Firing on February 1.—Arthur R. Hinks	441
Protective Markings in Animals.—Clarence Waterer	441
Snow Crystals.—C. J. Woodward	441
The New Star in Perseus. (Illustrated.) By Sir Norman Lockyer, K.C.B., F.R.S.	441
Recent Swiss Geology. (Illustrated.) By J. L.	445
George Francis FitzGerald.	445
Notes	447
Our Astronomical Column:—	
Variability of Eros	452
New Type of Shortened Telescope	452
Catalogue of New Variable Stars	452
New Component of the Polar Motion	452
Inauguration of a Birmingham Section of the Institution of Electrical Engineers	452
The Tamnau Mineralogical Endowment. By Prof. H. A. Miers, F.R.S.	453
Craniology. By N. C. Macnamara	454
University and Educational Intelligence	458
Societies and Academies	458
Diary of Societies	460